TABLE 1. Number of male *Hyalophora cecropia* recaptured at sites other than the release point, the distance between these points, and the number of days that elapsed between release and recapture.

Trap at which male was:		Distance (km) between traps	No. males	Days (or range) between captures
Released	Recaptured			
JGS	GPW	6.8	8	3–8
GPW	JGS	6.8	8	1–7
Trelease	JGS	6.8	1	1
JGS	Trelease	6.8	1	2
GPW	Trelease	12.5	1	8

pheromone trail of a wild female before encoutering a trail from one of the traps. Similarly, in natural situations (without traps), the average distance flown by males searching for females should increase as the population density decreases. Our data (Table 1) suggest that for male cecropia moths these distances may be very long, and that reproduction could, therefore, continue even at very low population densities.

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HINDTIBIAL DEFENSIVE SPURS IN THE NEOTROPICAL SPHINX MOTH *AMPLYPTERUS GANNASCUS*?

A noticeable morphological feature of most adult Sphingidae is the double pair of elongate spurs on the tibia of the hindlegs (W. Rothschild and K. Jordan, 1903, A Revision of the Lepidopterous Family Sphingidae, Novitates Zool., Vol. 9, Suppl.). There is usually a proximal and terminal pair of these spurs, which are modified spines. The functional role, if any, of these structures is unknown. However, they are conspicuously long and rigid in some sphingid taxa. In this note I wish to suggest a possible defensive role of these hindtibial spurs in sphingids, based upon my being jabbed by the spurs of *Amplypterus gannascus* (Stoll) to the point of considerable bleeding.

On the evening of 19 June 1980 at about 1600 hours, I collected several freshly-eclosed adults of various sphingids resting on the lighted wall of a "cacao beneficio" building at "Finca Experimental La Lola," a large cacao plantation along the railroad line connecting Guapiles with the Caribbean port city of Limon, Limon Province, Costa Rica. Upon picking up one of the largest specimens, I suddenly felt a very painful stab into one of my fingers. At first I thought it was a wasp sting, thinking that I had inadvertently picked up a wasp in the shadows along with the moth. A copious flow of blood told me that I had been jabbed with something very sharp. The moth turned out to be *A. gannascus* and close examination revealed very long (10 mm) and stout hindtibial spurs (Fig. 1) capable of piercing soft tissues without hindrance. The spurs were present only on the hindtibiae of the moth.

Amplypterus gannascus is widespread throughout Central and South America and the Caribbean (A. Seitz, 1924, Macrolepidoptera of the World, Vol. 5, American Rhopalocera, Stuttgart) and it is one of the larger sphingids attracted to lights in lowland

FIG. 1. **Above:** *Amplypterus gannascus* from Finca Experimental La Lola, in southeastern Costa Rica, dorsal view; **Below:** hindtibial spurs of *A. gannascus* pointing upward and just to the left of the tarsal region.

tropical rain forest areas. Being a large insect, the moth, as well as other sphingids, may be a target for predatory vertebrates that forage at lights in the tropics. The grass and lower vegetation at the base of lighted walls is often littered with large toads that readily could take moths in the act of alighting. Certain species of bats may also take adult moths as they fly around lights. Both groups of insectivorous predators are abun-

dant in the tropics. Although sphingid moths commonly accumulate at lights along with many other insects in the wet tropics, the kind of defense suggested here would be adaptive when away from lights as well. Moths flying through darkness might be picked off by foraging bats. Some Neotropical insectivorous bats readily respond to wing-flapping noises from large moths confined to the same cages (M. D. Tuttle, pers. comm.). Successful capture of a large sphingid results in the predator obtaining a large protein- and lipid-rich food morsel.

The presence of hindtibial spurs of varying size in sphingids may represent an adaptation to defense against predators. When jabbed with the spurs, my reaction was to immediately release the captured insect, permitting its escape. Similar behavioral responses might occur if spurs can successfully lodge in soft tissues around or just inside the mouth of a predator. Alternatively, these pronounced spurs may have little or no direct defensive function *per se,* and perhaps are non-functional, or are used in other activities such as courtship or feeding, but, secondarily can be used opportunistically in defense. Closer scrutiny of the functional role of these spurs, in sphingids in general, is needed. Studies, including analyses of distribution among sexes within a species, spur sizes, and frequency of occurrence in tropical and extra-tropical taxa, should be done.

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TWO SPECIES OF SKIPPERS COLLECTED AT ANTIFREEZE-FILLED PITFALL TRAPS IN ARIZONA

During a research trip to the Southwestern Research Station, American Museum of Natural History, Portal, Arizona 85632 in 1978, the senior author was able to collect hundreds of skippers in antifreeze-filled pitfall traps. The skippers were subsequently determined by the junior author as *Atrytonopsis python* (Edwards) and *A. deva* (Edwards).

Four pitfall traps (plastic cottage cheese containers) were placed, flush with the ground, 10′–20′ apart around a pond that had a heavy red algal bloom. The traps were placed 3′–4′ from the water's edge with the intention of collecting ground dwelling beetles near the water's edge. The traps were ¾ filled with Dowguard® antifreeze for specimen preservation. The traps were checked every 2–3 days, emptied and new antifreeze put in to bring the trap level back up to ¾ full.

During the month of June, hundreds of the two above mentioned skippers were found in the traps, preserved in the antifreeze. A select number of the skippers were removed from the antifreeze traps and taken to the lab. They were carefully washed with 75% ETOH and placed on paper towel to dry. When the alcohol absorbed by the towel had dried, the specimens were pinned and spread. No adverse effects on scale coloration of the specimens were noted.

To the author's knowledge, this is the only known record of skippers being attracted to antifreeze. As ethylene glycol is present in both the antifreeze and the insects (Somme, 1964. Canad. Jour. Zool. 42:87–101), it may be acting as a "cue" to attract the skippers to the traps. Skippers of this genus generally are attracted to flowers, sometimes in swarms, according to Howe (1975, The Butterflies of North America, Doubleday & Co., Garden City, N.Y.). Use of this type of artificial lure may be a useful method